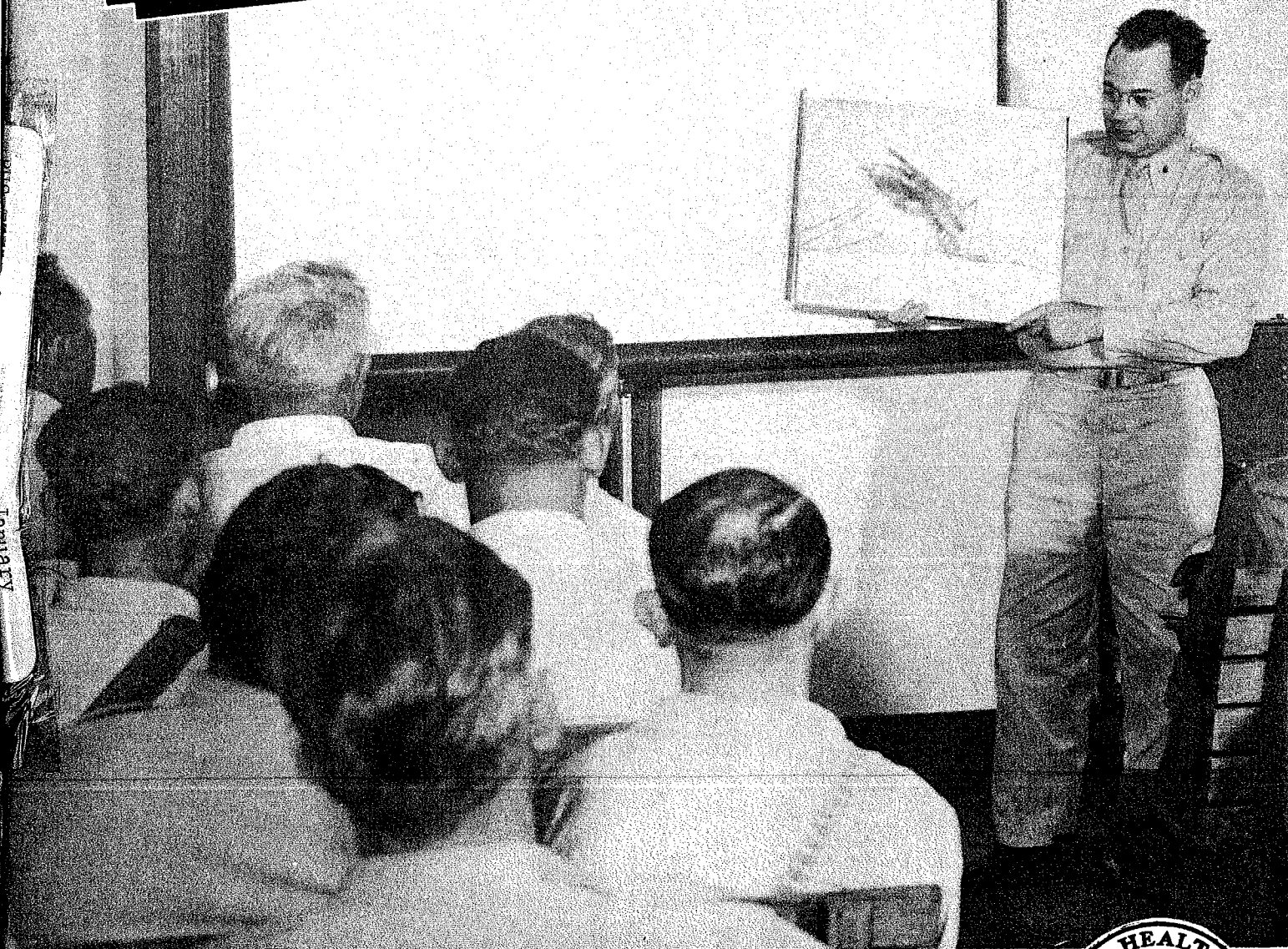


*Stallard Section*

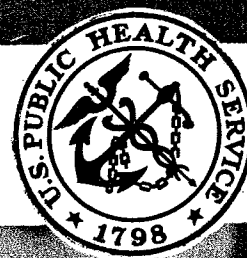
**FEDERAL SECURITY AGENCY  
U. S. PUBLIC HEALTH SERVICE  
Malaria Control in War Areas  
FIELD BULLETIN**



**MALARIA EDUCATION IN ARKANSAS**

**ATLANTA, GEORGIA**

**JANUARY - FEBRUARY - MARCH, 1946**

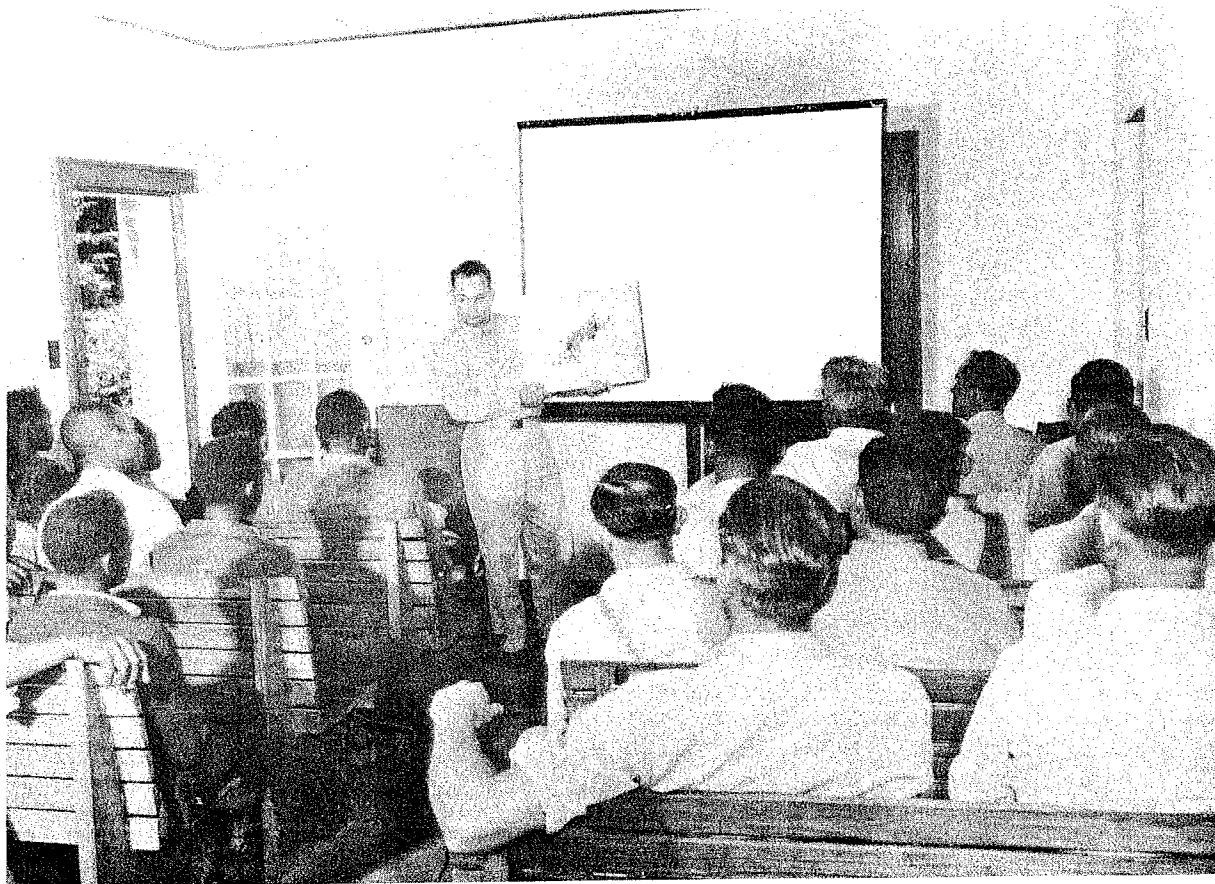


## TABLE OF CONTENTS

MALARIA EDUCATION IN ARKANSAS . .	1
Plans for Educational Program . . . . .	1
Organizations Cooperating in the Program . .	2
Educational Objectives . . . . .	2
Materials Used for the Educational Program .	2
Methods of Contacting the Public . . . . .	2
Educational Materials for Lay Distribution .	3
Workshops in Colleges . . . . .	4
Summary . . . . .	6
 SOME UNUSUAL BREEDING PLACES OF <i>ANOPHELES QUADRIMACULATUS</i> . . . . .	 7
 HEADQUARTERS NOTES . . . . .	 10
 DIVISION NOTES . . . . .	 13
 FIELD NOTES . . . . .	 22

# MALARIA EDUCATION IN ARKANSAS

By Asst. San. (R) Robert H. McCauley, Jr.



Operational Personnel Were Informed In Fundamentals of Malaria

During 1944 the need arose for additional educational work in connection with malaria control operations. Records in Arkansas showed that the people receiving the benefit of effective organized malaria operations during 1944 were principally those living near some war establishment which was being protected by drainage and larvicidal methods. Accordingly, plans were made for carrying on a winter project in malaria education for each of ten counties in which malaria control operations already were in progress.

## PLANS FOR EDUCATIONAL PROGRAM

Ten entomological inspectors were chosen to carry out the educational program. The primary objective was to present the facts of malaria transmission to the general public — individually and in groups. Emphasis was placed upon measures which individuals as well as communities can apply for malaria control, and upon the stimulation of appropriate action.

Preliminary training was given to these educators in a conference at Little Rock, Arkansas, November 6th to

10th, 1944, under the direction of Dr. William S. Boyd, Surgeon (R), and Miss Helen Martikainen. Techniques were outlined and the use of equipment and materials explained and discussed.

Immediately following the conference educational work in the ten counties was started under the supervision of Assistant Sanitarian (R) Robert H. McCauley, Jr. The men doing the educational work in the counties were called malaria control assistants.

### ORGANIZATIONS COOPERATING IN THE PROGRAM

The educational program was executed through County health units. County health officers provided contacts with local doctors and cooperated in many ways. County nurses, too, provided contacts and in many cases presented malaria control information. The only limiting factor in the cooperation of county health units was that frequently they were understaffed.

Educational activities usually began in the schools. School authorities were visited at the schools in their respective counties at least once. Movies or film strips were shown, literature distributed, and the malaria problem discussed. Later, when DDT promotional work was done by malaria control assistants, the school work conducted previously was of considerable value in opening the way to rural homes.

Newspaper editors gave excellent cooperation by providing channels for news releases. In many cases they were sources of important information in regard to their county.

Radio was utilized to some extent. All scripts were prepared in the state office for specific broadcasts. It proved impractical to prepare a script or series of scripts for general release.

### EDUCATIONAL OBJECTIVES

The educational program was further expanded during the winter of 1944-

45 to perform necessary promotional work in connection with the Extended Malaria Control Program. This activity was added to the duties of the malaria control assistants and became an integral part of preparations for the DDT house spraying program. Educational objectives related to the Extended Malaria Control Program were: (1) to acquaint the public with the program and its purpose; (2) to teach householders how to prepare their homes for the spray crew; and (3) to show the people how the work of the program reduces malaria transmission, and why it is necessary to vary the method of control in different places.

### MATERIALS USED FOR THE EDUCATIONAL PROGRAM

Materials developed for use in promoting the Extended Malaria Control Program included a comic strip folder "How DDT Spray Keeps Malaria Away," a modified version of the folder "Spray-time," and a mimeographed form letter informing householders of the house spraying program and asking for their cooperation in the work.

A copy of the comic strip was distributed to each house by lead men on the spray crews at the time of the second spraying. Along with materials from their office, the Agricultural Adjustment Agency distributed 34,000 copies of the form letter. The malaria control assistants distributed 50,000 copies of the folder "Spray-time" during their educational work prior to the time the spray crews began their operations.

### METHODS OF CONTACTING THE PUBLIC

The Agricultural Extension Service cooperated with the program in many ways. Home Demonstration Agents Arranged for the malaria control assistants to attend club meetings and present information on malaria and the control program. County Agents invited these men to speak at other meetings, to 4-H Club groups, and, in at least one instance, to present material over the radio.

The Farm Security Administration assisted in distributing form letters and the folder "Spraytime" and by helping the malaria control assistants make necessary contacts with people in their counties. Farm Bureau representatives in each county aided in arranging meetings, in distributing promotional material, and in actively backing malaria control activities.

Lead men of the crews were encouraged to discuss the home spraying program with the householders. By doing this, the basic facts of malaria transmission were explained to a large part of the rural population of Eastern Arkansas. Occasional meetings were held with all operational personnel attending. These meetings were designed to increase interest and efficiency by demonstrating the meaning and significance of larviciding and spraying.

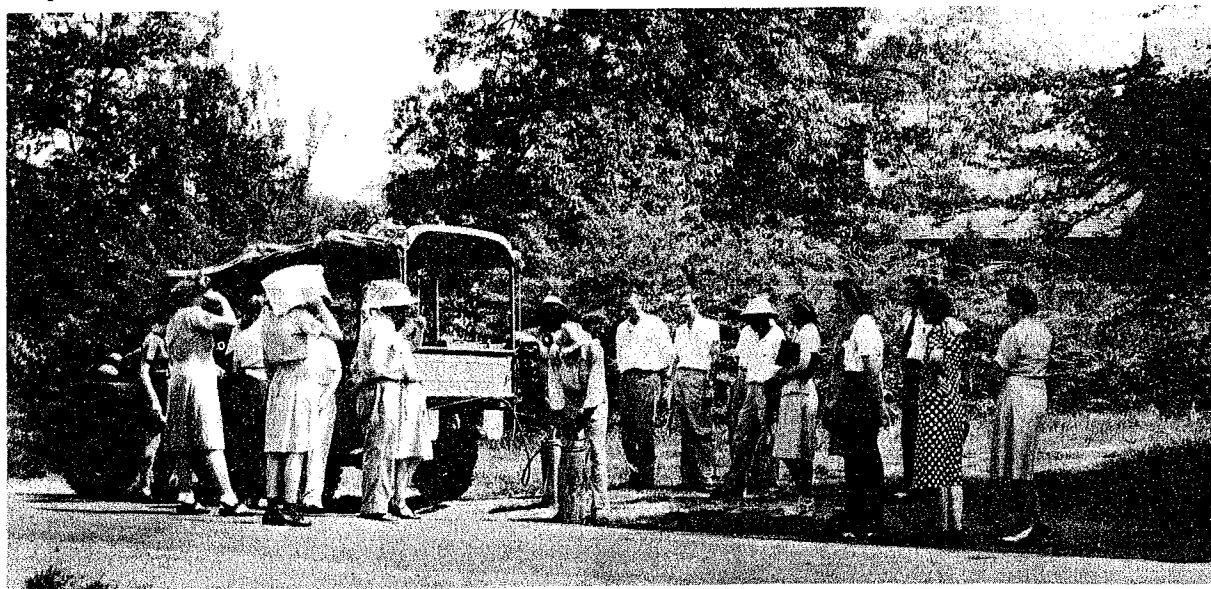
The basic premise in disseminating information is that people can be reached best through individuals and groups in a community who have the greatest influence on the lives and thoughts of others. As the program progressed it became apparent that effective performance of this type of work required the application of exacting techniques in public relations. The educators must

have the ability to influence people and conduct the work with imagination and initiative. Accomplishments of personnel assigned to the counties were in direct proportion to their possession of these abilities.

### EDUCATIONAL MATERIALS FOR LAY DISTRIBUTION

Soon after the program started Miss Frances Babin was employed to prepare news releases, develop radio scripts, educational materials, and perform other public relations services to aid in furthering the educational program.

The monthly publication "Arkansas Malaria Bulletin" was organized in the spring of 1945. The first issue appeared in April 1945 and has continued each month since. The purpose of the bulletin is to present a coordinate account of the work to field personnel, and to provide a stimulus for malaria control activities by exploiting the spirit of competition of the field personnel. Each month the activities of one section of the program, such as operations or education, are featured in the principal article. In addition, monthly tabulations of results of entomological, operational, and educational activities are published.



Demonstrating Spray Equipment to Workshop Class



Group from Workshop Observing House Spraying

### WORKSHOPS IN COLLEGES

Considerable attention has been given to health education of children in the schools, with cooperation of the teachers. Short courses or workshops in four Arkansas colleges helped prepare and train instructors to teach malaria sanitation. Authorities in the University of Arkansas, the State Teachers' College, the Agricultural and Mechanical College, and the Agricultural, Mechanical, and Normal College were very cooperative in making appropriate arrangements for the workshops.

Subject matter and methods were adjusted to the length of time available

for presenting the course. At the University of Arkansas two hours were allowed for presenting the materials as part of a Health and Physical Education Workshop. At the Agricultural and Mechanical College, fifteen hours were allowed the State Malaria Educator in the workshop.

Table One shows the number of hours allotted at each of the colleges and the total number attending classes. Many of those attending were teachers.

It is impossible to evaluate accurately the full benefits of these classes. An outstanding accomplishment was the establishment of precedent. At each of the schools, authorities requested that the classes be repeated next summer.

TABLE ONE

COLLEGE	HOURS	TOTAL ATTENDANCE	NUMBER TEACHERS ATTENDING
A. & M. College, Monticello, Ark. May 28 - June 1, 1945	15	41	28
July 23-27	15	15	11
State Teachers' College, Conway, Ark. June 4-8, 1945	12		
A., M., & N. College for Negroes June 11-15, 1945 - Pine Bluff, Ark.	5	24	23
State Dept. of Education, Dewitt, Ark.	3	43	43
Univ. of Ark., July 10-11, 1945.	2	28	



All the students were enthusiastic about the work. It was interesting to note that the teachers were aware that malaria is an important health problem. Most of them could visualize ways of incorporating malaria teaching into their regular programs. Discussions, demonstrations, field trips, demonstrations of technics for making blood smears, and the showing of films and film strips all had their place on the workshop program.

An effort was made to check the effectiveness of the presentation at each of the workshops by submitting a short questionnaire to each participant. An interesting sidelight on lay educational films was obtained by asking the question, "Which film, in your opinion, presents its point most effectively?," referring to the films shown. Of 85 students who indicated a preference, 47 preferred "Malaria;" 24, "The Criminal at Large;" and 14, "The Winged Scourge." The reason given most commonly for the choice of "Malaria" was that it showed the typical everyday malaria problem affecting an ordinary rural family. All groups except the Negro group at Pine

Bluff preferred "Malaria." The Negro group voted overwhelmingly for "The Winged Scourge" as their choice.

Proper instruction of persons and families affected with malaria was an important part of the education program. Since these persons are usually interested they provide an ideal means of promoting malaria control sanitation. This phase of the work was introduced by letters to the physician sent through the county or district health officers. The purpose of the program and the need for their cooperation was explained. The malaria control assistant then contacted physicians personally, to explain more fully the methods and objectives of the program and to work out with the doctor procedures for reporting cases. Each physician was requested to submit to the county health officer weekly a list of names and addresses of all patients in whom they had personally diagnosed malaria. In addition, they were urged to obtain a blood film from each patient. Slides and mailing cases were supplied to physicians so that they could easily avail themselves of the services of the State Hygienic Laboratory.



Class from a Workshop Dipping for Mosquito Larvae

The people were urged to go to a physician for the treatment of malaria. As an inducement, the offer was made to spray the house of each person whom a physician reported to have malaria. House spraying was to be done provided the house had not been sprayed within thirty days previously.

This activity had many important results. Among them were: 1) getting more malaria patients to go to doctors for treatment; 2) concentrating educational efforts on people who have had the disease; 3) establishing a firm contact with doctors who can help greatly with general malaria education; and 4) informing physicians of their important part in malaria prevention activities.

These activities improved significantly the reporting of malaria cases. Until November 24, 1945, 2201 cases of malaria had been reported in Arkansas, as compared to 1399 cases for the same period in 1944. It is unlikely that more malaria actually occurred in Arkansas in 1945 than in 1944. Increased awareness of the disease among all levels of society accounted for the apparent increase in number of cases. Until November 16 a total of 892 cases was reported to the state office by the malaria control assistants. Each of these cases was reported to a county health unit and was based on the diagnosis of the physician. Of the total number, 222 were from homes which had been sprayed.

As part of the program for apprehending malaria cases, attempts were made to locate discharged service men who had malaria while in service. Local draft boards cooperated by asking each veteran reporting for reclassification, whether or not he had had malaria. A form was prepared for recording information as to where and when the infection was acquired, his name, mailing address, and location of

his home. The local Selective Service boards cooperated splendidly in this project - 49 out of 59 local boards made weekly reports. Names of 464 returned veterans who have a malaria history have been obtained through this procedure. Personal contacts are being made with these men to inform them in methods of malaria sanitation for the protection of their families and neighbors. There are acknowledged weaknesses in this method of finding malaria-carrying veterans, but it is believed that the information obtained is a sound malaria education procedure.

## SUMMARY

This article reports activities in malaria control education in Arkansas during 1945. The educational program began as a winter activity. Ten entomological inspectors were given a brief course in educational procedures in the fall of 1944. These ten men worked during the winter months with schools, county health units, and with various other organizations and individuals in carrying out a program of lay education in malaria.

When the Extended Malaria Control Program began operations, the field of activities for the educators was expanded to include promotional work and in-service training of operational personnel.

In both the promotional work and in the program of general malaria control education, the educators worked closely with school superintendents, health officers, home demonstration agents, and various organizations already working in the various counties.

Activities of particular interest were: (1) the follow-up procedures on reported malaria cases; (2) apprehending imported malaria in returned veterans; and (3) the four workshops held in teachers' colleges throughout the state.



# SOME UNUSUAL BREEDING PLACES of *Anopheles quadrimaculatus*

By San. (R) T. E. McNeel

Persons without extensive experience in collecting *Anopheles* are often impressed when atypical *A. quadrimaculatus* breeding places are encountered. These places differ from text-book descriptions of representative environs and usually from those observed in field training courses. Observation of these "believe it or not" situations have often resulted in publication of notes describing the "unusual" breeding places. A statement is often made that "quads" don't read the books and consequently don't behave in the manner described. There is a strong possibility that the entomologist may not have read enough books. Most of the unusual types of breeding places have been described in the literature.

Oviposition occurs in abnormal situations when the adult "quad" density is very high or when available watered areas are scarce. It is not known definitely whether "quads" actually prefer certain types of aquatic environment for oviposition or whether certain places are not conducive to complete development. Either case would account for the usual absence of larvae in atypical places. It is significant that larvae are observed usually in such places when the adult "quad" population is unusually high. This situation might be called a "pressure area." Regardless of the causative factors, the observation of limited breeding in a few unusual places should not upset preformed conceptions of "quad" ecology.

The examples listed represent most of the types of atypical situations en-

countered. These have been obtained from the literature and from the experience of MCWA entomologists.

## "QUAD" BREEDING IN ARTIFICIAL CONTAINERS (1)

An impressive example of breeding in artificial containers occurred in a thickly settled colored settlement of Baton Rouge, La. During the rainy spring of 1943 mosquito breeding in this zone was completely out of control. After a period of dry weather, control was regained. A week or two later adult counts in several "A" zone stations in one section reached one hundred, and remained high consistently. There were no typical watered areas present for "quad" breeding. Intensive searches located as many as seventeen water containers of various descriptions at each house of this section. The containers were full of "quad" larvae. "Quad" adults were present also in great numbers. Containers were treated with phenothiazine and the adult counts in neighboring stations dropped almost immediately to satisfactory figures. This situation is one of the few known examples in which breeding in artificial containers was responsible for a zone being out of control.

## BREEDING IN SALINE WATER (1)

At least two people have reported "quad" breeding in Contraband Bayou at

---

(1) From Field Notes supplied by Mr. E. B. Johnson, Entomologist, Louisiana State Board of Health.

Lake Charles, La. The water in the bayou has a high saline content which can be detected by taste. If the reports of breeding are true, they are most unusual, since a very small amount of salt will generally be effective in preventing "quad" breeding.

#### "QUAD" LARVAE TAKEN FROM HOUSEBOAT <sup>(1)</sup>

In Monroe, La. during August of 1936, a wave of adult "quads" appeared in a one block section of the water front. Within two days more than four blocks on the waterfront were involved. Investigation disclosed that bilge water in a houseboat tied to that block of the waterfront was teeming with "quad" larvae. Five days after treatment the adults had disappeared.

#### FIRE BARRELS USED BY "QUADS" <sup>(1)</sup>

Fire barrels in a creosote plant proved to be a source of "quad" breeding in Alexandria, La. An adult resting station which had been negative previously, jumped to a count of seven adults per inspection. The inspector for this area found "quad" larvae in the old fire barrels. At one time all the barrels had contained creosote, but the creosote was so old it did not have any larvicidal effect. If this source of breeding had not been discovered early it is likely that the adult station count would have gone higher.

#### LARVAE TAKEN FROM ARMADILLO HOLES <sup>(1)</sup>

Heavy "quad" breeding occurred in hundreds of armadillo holes near Camp Polk, La. This was observed at all times of the year when the holes held water, but was particularly noticeable during cool weather after breeding had stopped elsewhere. Breeding was sufficient to cause serious trouble, and probably required more control work than any other one class of breeding place in the zone. Control started in 1941 and has continued to date.

#### UNDERGROUND BREEDING <sup>(1)</sup>

In one "A" station in Pineville, La., the adult mosquito count continued to average more than ten adults per station, in spite of repeated efforts to locate the cause. After ten weeks of search for the source of the trouble, one of the men who was walking across a filled-in area noticed several mosquitoes emerging from a small hole in the ground. Investigation showed that a big pile of tin cans had been covered over with dirt, but a few small openings into the pile still existed. *Anopheles quadrimaculatus*, *Anopheles punctipennis* and *Aedes aegypti* were breeding together in the same containers. After the area was treated, the adult station was under control for the first time.

Another example of underground breeding occurred in a number of jug cisterns in Monroe and West Monroe, La. The water was shallow and polluted, but during one inspection there was a count of 250 adult "quad" mosquitoes in a calf shed adjacent to a cistern. Later in the year, after the jug cisterns had been filled in with dirt, adult "quad" counts in the two cities dropped to zero.

#### BREEDING IN RUTS <sup>(1)</sup>

At Barksdale Field during June and July of 1940, there was heavy quad breeding in ruts made by wheels of airplanes. Planes used in maneuvers formed ruts in the muddy field. These ruts were continuously filled with water, and both breeding and emergence were tremendous. One night, between eight and ten o'clock, seventy-five "quads" were found in a small room inside the Post Hospital. Within ten days after the ruts were treated, adult "quad" mosquitoes had disappeared from the hospital section.

#### "QUAD" LARVAE IN OLD FORT <sup>(1)</sup>

Eleven fourth instar "quad" larvae were found in a flooded concrete room

of old Fort Jackson. The only opening was a door to the west. Breeding with the anopheline larvae were *Culex salinarius* larvae. A large number of anopheline adults, mostly "quads," were resting in the room.

#### SEWER AND SEPTIC TANK BREEDING<sup>(1)</sup>

Breeding in sewers occurred in Monroe, La. during a period extending over three years. Because of the underlying quicksand, the sewers held pockets of water. Unless these pockets were kept oiled, adult "quads" could be observed at inlets. Large masses of larvae would appear at the outlets when rain flushed them out. Treatment resulted in control.

Breeding in storm sewer inlets at Alexandria was sufficiently severe to cause adult "quad" counts up to seventy-five per inspection in nearby stations. A number of larvae were dipped from the area. After treatment of the sewers had started, adult counts in catching stations were reduced to a satisfactory number.

During May and June of 1942 in West Monroe, Louisiana, much heavier "quad" breeding occurred in septic tank drains than in nearby clean water. When control work started, adult mosquito counts were very high, but dropped quickly when work was concentrated on the septic tank drains.

#### LARVAE TAKEN FROM FLOWERS<sup>(1)</sup>

Perhaps the most unusual breeding place was the crown of a Nassau lily.

Recently M. W. Yates, Chief Engineering Aide, reported "quad" breeding during periods of high waters, in sewage-polluted impoundments associated with Wolf Creek, a small stream emptying into the Mississippi River near Memphis, Tennessee.

Five sewer mains and several open ditches discharge more than 13,000,000 gallons of sewage daily into Wolf Creek.

During periods of high waters in the Mississippi, little flow occurs in Wolf Creek. As a result, the impounded water

During a period in which there was a great deal of rainfall, the author was annoyed by small but persistent numbers of "quads" entering his home. Careful search of the known breeding places nearby showed that they were all under good control. However, as the owner passed through the garden, he noticed water in the crown of two Nassau lilies. Observation revealed the presence of about eight large and several small "quad" larvae, and one pupa which developed into an adult "quad." After removal of the larvae, pupa, and water from the lilies, annoyance by "quads" ceased.

#### OTHER BREEDING PLACES<sup>(2)</sup>

In addition to the unusual breeding places already described, other areas include: a garden fountain, an ordinary glass bottle, hollow stump of a burned oak tree, an iron pot, water troughs, flood waters heavily polluted with sewage and wastes, an above-ground cistern, and rain barrels. As investigations take place it is very likely that additional unusual breeding places will be found, since it appears that "quads" will breed in almost any collection of water, under some conditions, unless the water is extremely foul.

---

(2) From Field Notes supplied by MCWA Entomologists assigned to State Board of Health Offices in USPHS District 4.

becomes highly polluted. When it recedes, impoundments of polluted waters are left in the stream bed.

On two occasions great numbers of adult "quads" appeared over the area, and investigations showed that "quad" larvae were breeding with rat-tailed maggots in the polluted potholes over the sludge deposits. It seems that in these instances "quads" demonstrated their ability to adapt themselves to conditions usually considered unfavorable.

# HEADQUARTERS NOTES

## PERSONNEL CHANGES AND ASSIGNMENTS

On March 4, Surgeon (R) William Boyd was transferred from Chief of the Training and Education Division and made Assistant Coordinator of Professional Activities. At that time, Sr. San. Engr. Ellis S. Tisdale became Acting Chief of the Training and Education Division.

The Diagnostic Laboratory has been designated as the Division of Laboratory Services. Dr. Seward E. Miller is in charge of this division.

Engr. (R) Francis A. Jacocks, former chief of the *Aedes aegypti* section of the Engineering Division, was transferred to Richmond, Virginia to serve as MCWA District Engineer for District Number Two. S. A. San. Engr. (R) Chris A. Hansen, along with his other duties, will assume the responsibility as head of the *Aedes aegypti* Section.

S. A. San. (R) Ralph C. Barnes, Entomologist, arrived from New York to replace S. A. San. (R) Herbert Knutson in the In-Service Training Section.

S. A. Engr. (R) Ernest Dubuque became Chief of the In-Service Training Section in January.

At the end of June, Sr. San. Engr. (R) John M. Henderson will assume his duties as Professor of Sanitary Science at Columbia University, School of Public Health, New York City. He was appointed to this position January 1, 1944, but was granted military leave since his services were needed vitally on the MCWA program.

S. A. San. Engr. Frank Tetzlaff has been named to succeed J. M. Henderson as head of the Engineering Division. Mr. Tetzlaff reported for duty the middle of March so that Mr. Henderson could have more time to devote to over-all technical planning and consultation. Mr. Tetzlaff has been on the staff of U.S.P.H.S. District Two for the past five years.

Because of the possibility of typhus becoming a threat to the people of Washington, D.C., the Health Department from District Two requested that J. J. Essex, San. (R) be sent to the area in the immediate vicinity of Washington, D. C. to investigate the problem and inaugurate control operations.

Rodent control procedures included DDT dusting operations, rat poisoning, and trapping for rats. The trapped rats were used in making serological tests. A great deal of publicity was given the program and newspapers referred to Dr. Essex as "Pied Piper Essex."

S. A. San. (R) Richard J. Hammerstrom was assigned to the In-Service Training Section to work on typhus. He replaces S. A. San. Engr. (R) Vinton M. Bacon who left during the middle of January to join the Engineering staff of the Los Angeles County Sanitation District.

S. A. Engr. (R) Gerald Dyksterhouse was transferred from the Impounded Water Section of the Engineering Division to Assistant to the Chief of the Engineering Division, Headquarters.

Surgeon (R) William S. Boyd and S. A. Surgeon David Ruhe were in Puerto Rico during the latter part of January for a conference with members of the School of Tropical Medicine, the Public Health Service, and the Insular Health Authorities. The purpose of the conference was to discuss the procuring of teaching materials and audiovisual aids for supply to the Tropical Disease Laboratory, to secure photographic materials for a film strip on filariasis, and to discuss procurement of photographic documentary material on the MCWA program in Puerto Rico. In addition, there was discussion of the preparation of materials for a motion picture which would show the life cycle of *Schistosoma mansoni*.

San. Engr. John C. McNair returned

from duty with the navy and was assigned to MCWA Laboratory, Savannah, Ga.

S. A. San. (R) Howland C. Lutz reported to North Carolina in January for duty on the Typhus Control Program. Mr. Lutz was formerly with UNRRA in Italy.

Harry C. Essick reported to New Orleans for a temporary assignment to inaugurate rat proofing activities in that area.

San. Robert D. Cowan was transferred from the Emergency Health and Sanitation Activities in Mississippi to North Carolina for Typhus Control after completing the Atlanta training course.

S. A. San. (R) Barnard Brookman was assigned to the Hooker Foundation for studies on Japanese B Encephalitis in California. Mr. Brookman was formerly on duty in Honolulu, T. H.

Three returned servicemen have joined the photographic unit of the Training and Education Division recently. Included are: Richard Black, formerly a photographer with the Navy; and John Adams and William Long from the Army. Frank Tuggle, formerly a photographer with the Atlanta Journal has been added to the staff also.

S. A. San. (R) L. Clark Peckham, originally from Wisconsin, was assigned to the Public Health Internship Section. He will instruct in Public Health Internship in Savannah, and direct some of the field activities of the program.

S. A. San. (R) C. E. Gerhardt was released from active duty with MCWA the middle of March to accept employment with a commercial exterminating company in Roanoke, Virginia.

San. (R) Ralph S. Howard, Associate Chief of the Engineering Division, left the Service Jan. 31 to assume his new position as Superintendent of Public Works, Dougherty County, Georgia.

S. A. San. (R) Herbert Knutson left the Service in February for his former teaching position at Rhode Island State College.

S. A. Engr. (R) David S. Butler transferred from Walterboro, South Carolina to Impounded Water Section, Atlanta.

Engr. Aide Richard Beldt was transferred from Charlotte, North Carolina to the Southern Georgia Typhus Investigation Program in Thomasville.

Asst. Engr. Lewis D. Anderson transferred from Hilton Village, Virginia, to the rat proofing program in Raleigh, North Carolina.

Engr. Aide Tom Oliver, formerly with the Typhus Control Unit, returned from military service to Columbia, South Carolina. He will be assigned to rat proofing activities in that state.

Engr. Aide La Due C. Holliday, returned veteran formerly with the Typhus Control Unit has been assigned to the South Carolina Typhus Investigation Program at Thomasville.

#### VISITORS TO HEADQUARTERS

Dr. Henry Vaughn, formerly chairman of the Michigan Board of Health, and present Dean of the University of Michigan School of Public Health, visited Headquarters in January. Dr. Vaughn was particularly interested in the Public Health Internship which is being developed.

Chief of the Budget for Public Health Service R. L. Harlow from Washington D. C., was in Atlanta during March for conference and review with the Budget and Fiscal Section.

Louis A. Lindecop, of U. S. Quarantine Station, Rosebank, Staten Island, New York, spent two days discussing rat proofing and touring the Atlanta project.

The following were visitors recently to the In-Service Section of the Training and Education Division:

R. B. Deen, District Agent, U. S. Fish and Wildlife Service, State College, Mississippi.

Theodore Oser, president of the National Pest Control Association and William O. Buettner, secretary. Mr. Buettner told the class about the work of the pest control operators.

S. O. Hill, Ray W. Kings, and W. D. Sudia from the Fourth Service Command Entomology Laboratory.

Miss Richardson, teacher from Bass Junior High School, and nine ninth grade pupils. They were shown ectoparasites of rats through a microscope, and were supplied with literature on typhus control.

Major Daniel M. Jobbins, Entomologist with the Pan American Sanitary Bureau, Guatemala, C. A.

Lt. Col. Cavalcade and Commandant Arque of the French Colonial Mission, and Dr. Hernan Zuniga, Entomologist, San Salvador, C. A. They were shown films on malaria control and typhus control and were furnished complete sets of literature and training aids.

Henry Flick, chief chemist for General Mills. Mr. Flick was especially interested in securing information and literature on rodent control.

A special showing of films and film strips was held on January 15 for Mr. Summerlin and six of his typhus control personnel from Fulton County.

The following visited the Typhus Control Courses recently:

San. (R) T. E. McNeel, Entomologist from District Four.

L. C. Whitehead, Biologist, District Agent, U. S. Fish and Wildlife Service, Raleigh, North Carolina.

Charles B. Woodhouse, Associate Biologist, Assistant District Agent, U. S. Fish and Wildlife Service, Raleigh, N. C.

S. M. Canup, Assistant District Agent, U. S. Fish and Wildlife Service, Raleigh, North Carolina.

H. J. Spencer, Biologist, U. S. Fish and Wildlife Service, Gainesville, Fla.

## JAPANESE B ENCEPHALITIS STUDY

Sr. San. Engr. (R) John M. Henderson was in California during January to plan MCWA operational activities for the 1946 mosquito control program. While in California, Mr. Henderson reviewed the Japanese B Encephalitis research which is being carried on in cooperation with the Hooper Foundation of the University of California.

Japanese B Encephalitis, which has a mortality rate materially higher than that of encephalitis strains found in the United States, constitutes a potential hazard to this country because the importation of a single human carrier or of a single infected mosquito vector would be sufficient to start the spread of the disease over the country. It has been determined definitely that a number of the more prevalent species of mosquitoes found in California are capable of transmitting the infection.

MCWA is carrying on selective control of native California species of mosquitoes in the immediate vicinities of some of the primary international military airports receiving aircraft from Japan and Okinawa. Field research and experimental mosquito control activities will be carried on in California during the 1946 mosquito breeding season by MCWA and the Hooper Foundation in an effort to obtain more definite information about the possibilities of transmission of Japanese B Encephalitis in this country. The 9th Service Command, USPHS District 5, and the California State Health Department are cooperating in this work and in other mosquito control activities.

While in California Mr. Henderson also inspected the Impounded Water Survey program which is being carried on in connection with the California State Health Department and the Sacramento District Office of the U. S. Engineers.



# DIVISION NOTES

## MEDICAL DIVISION

**VACCINATION OF TYPHUS PERSONNEL.** The Medical Division has received to date requests for typhus vaccine from six states: Alabama, Tennessee, Georgia, South Carolina, Louisiana, and Arkansas. Enough vaccine for approximately 400 typhus employees has been supplied to these states.

Among those being vaccinated are 20 persons working on the Nutritional Investigation Program in Albany, Ga., and 50 employees of a factory in Knoxville, Tenn. In addition, all typhus employees enrolled in the training course at Headquarters in Atlanta have been vaccinated.

**FLY CONTROL PROGRAM IN TEXAS.** MCWA and the National Institute of Health are cooperating in Hidalgo County, Texas, in a program designed to demonstrate the degree to which dysentery and diarrhea can be controlled by controlling flies. Fly control operations are the responsibility of MCWA; the NIH is in charge of the epidemiological phases of the work.

Hidalgo County was chosen as the site of the dysentery and diarrhea control operations because of the high incidence of these two diseases there. Actual work is being done in five towns, while five comparable towns are being used as controls. In the towns where the operations are being carried on, DDT residual and space sprays are being used against the adult flies, and orthodichlorobenzene is being employed as a larvicide.

Dr. James Watt of the NIH is Medical Officer in Charge of the program, and S.A. San. (R) Dale R. Lindsay of the USPHS is in charge of vector control. Dr. Lindsay gained experience in fly control last year on the polio control experiments conducted by the Commission of Neurotropical Diseases and MCWA in Patterson, New Jersey.

S.A. Surgeon H. K. Dickert assists Dr. Lindsay as operations officer. Headquarters for the program are at Pharr, Texas.

**ELECTION TO AMERICAN STATISTICAL SOCIETY.** San. (R) Faye M. Hemphill was elected recently to membership in the American Statistical Association. Membership to this organization carries with it the privilege of individual consultation and assistance on all matters and problems of a statistical nature.

## ADMINISTRATIVE DIVISION

**INTERNATIONAL BUSINESS MACHINES INSTALLED.** The two International Business machines installed recently at Headquarters in the Service Unit under Mr. Burrowes are being used extensively by the Medical Division and the Personnel Section and will be used by others in the near future.

The Medical Division is making an interpolated study of the populations of the inter-censal years for malaria and typhus fevers for every county in the United States. Morbidity and mortality records for these diseases will be recorded and made available.

Personnel Section is using the machines for tabulating complete records on cards for every employee of MCWA. If an employee is transferred a new card is made out for him, and the old one is filed. Dates on which ingrade promotions are due employees may be computed two to three weeks in advance so that they become effective the day on which they are due.

Budget and Fiscal Branch proposes to make use of the machines beginning July 1, to show detailed cost and budgetary control figures. Reports of actual cost of operations will be shown by states, by programs, and by object of expenditures. Listings of unliquidated obligations will be furnished

also. Account records will be correlated with the new system to show status of allocations for each state and each division.

According to the operator of the International Business Machines, 100 to 1000 cards can be punched in an hour by the Alpha Key Punch machine. The alphabetical keyboard of this machine is similar to that of a typewriter. In addition, it has a numerical keyboard. Another machine counts and sorts cards either alphabetically or numerically at a speed of 450 cards per minute.

### LABORATORY SECTION

**TRAINING COURSE IN LABORATORY DIAGNOSIS.** The second two-weeks training Course in Laboratory Diagnosis of Tropical Diseases started January 7. The course was attended by personnel from thirteen states.

**LABORATORY SERVICES EXTENSION PROGRAM.** The Laboratory Services Division inaugurated an extension service recently, sending out various specimens of parasites to former students of the Laboratory Diagnosis course presented by the Laboratory Services Division.

This new service enables the Laboratory Services Division to maintain contact with former students, and provides the students with a supply of materials to serve as a refresher. It is planned eventually to extend this service to other laboratories as well as to former students.

The Laboratory Diagnosis course has undergone extensive revision, and the classroom has been rebuilt to provide more suitable accommodations for classes.

**VIRUS LABORATORY AT MONTGOMERY.** According to a letter from Dr. B. F. Austin, State Officer of Alabama, the buildings and laboratory facilities at Montgomery, used formerly as a laboratory for rabies investigation by Rockefeller Foundation, were turned over to the U. S. Public Health Service on March 24, for carrying on virus

studies. These facilities will be utilized by the MCWA Division of Laboratory Service in conducting these studies.

### ENTOMOLOGY DIVISION

**NEW ENTOMOLOGICAL FORM FOR REPORTING PRECIPITIN TESTS.** In order to simplify both the recording of data for mosquito collections submitted for precipitin tests in connection with host preference studies, and the reporting of results of tests back to the State Officers, a new form, CDC 100-1 has been devised. Effective immediately this form is to be filled in *in duplicate* for each collection, and both copies forwarded with the collection to the testing laboratory. After the tests have been made, the results will be entered on both copies of the form and one copy will be returned to the State for its files.

Since the reliability of conclusions drawn from analyses of these records will depend on accuracy of original data, it is urgently requested that careful attention be given to accuracy, legibility, and completeness in filling form CDC 100-1.

Instructions for filling in these forms have been sent to all field personnel in the form of a field memorandum, No. 63. A copy of Form CDC 100-1 accompanies the memorandum.

All specimens should be mailed as follows: Officer in Charge  
U. S. Public Health Service  
Virus Laboratory  
Box 436, Route No. 3  
Montgomery, 5, Alabama

**BRADLEY VISITS CALIFORNIA.** Sr. Entomologist (R) George H. Bradley was in California during February for the purpose of looking over MCWA projects and conferring with local officials on plans for the coming season. While there, Mr. Bradley attended the meetings of the California Mosquito Control Association, at which he presented an address, "The Use of DDT in the Malaria Control in War Areas Program of the United States Public Health Service."

## PERSONNEL SECTION - CIVIL SERVICE

**EFFICIENCY REPORTS DUE.** Efficiency reports are due for all employees who have been with MCWA for a period of at least 90 days prior to March 31, 1946. If these reports have not been signed and sent in, this matter should be taken care of immediately, since no ingrade promotions may be given employees, nor new ratings assigned until these reports have been completed.

## PUBLIC HEALTH INTERNSHIP SECTION

**INTERNSHIP TRAINING MANUAL COMPLETED.** The manual "Internship in Public Health Practice," designed for use by trainees in Public Health Internship Courses, was completed in March.

This manual was developed by the training staffs of the U. S. Public Health Service and the Savannah Health Department. It contains outlines for training persons as health officers, public health nurses, sanitarians, sanitary engineers, health educators, veterinarians, and record analysts.

## TRAINING AND EDUCATION DIVISION

**FILM STRIPS AND MOTION PICTURES AVAILABLE FOR GENERAL USE INCLUDE THE FOLLOWING:**

**REARING AND HANDLING OF ANOPHELES MOSQUITOES,** available as a black and white, sound, motion picture; running time about 17 minutes. This film is a documentary account of techniques used in insectary rearing of mosquitoes at the Williams Malaria Research Laboratory at Columbia, S. C. It describes methods of controlling temperature and humidity in the insectary, the feeding of adult female anophelines, handling, storing and shipping of mosquito eggs, and the rearing of larvae and pupae. Production number is MCWA-TE-4-006.

**LABORATORY DIAGNOSIS OF SCHISTOSOMIASIS** is a color, sound, film strip; running time about 19 minutes. This film describes four methods used for

diagnosing Schistosomiasis: (1) by a simple fecal smear, (2) by the acid-ether method, (3) by centrifugal sedimentation, and (4) by rectal biopsy. *Laboratory Diagnosis of Schistosomiasis* is designed to meet the needs for training technicians in parasitological techniques. Production number is MCWA-TE-5-041.0.

**SCHISTOSOMIASIS, EDITION II,** is a color, sound, film strip. This film emphasizes biological relationships between host and parasite, rather than diagnosis and treatment. The history of Schistosomiasis, the parasite causing the disease, and methods of diagnosis and treatment are outlined. Running time is about 19 minutes. Production number is MCWA-TE-5-006.1.

**CRIMINAL AT LARGE** is available as a 16 mm. motion picture with sound. This is identical with the film strip but designed for showing on a 16 mm. projector when a film strip projector is not available. Production number is MCWA-TE-4-012.

**EXPERIMENTAL TRANSMISSION OF MALARIA** is a 16 mm., black and white, sound, motion picture, produced in cooperation with NIH malaria investigations at Columbia, S. C. It is a documentary film which shows techniques of experimentally transmitting malaria by *Anopheles* mosquitoes. Production number is MCWA-TE-4-008.6.

**USE OF 1080 WATER IN RAT POISONING** is a black and white, sound, film strip; running time about 18 minutes. It is designed to show interested personnel methods which should be followed and precautions to be observed when using 1080 Rodenticide. The film is prepared on the basis of present knowledge of the poison. As investigation and research reveal additional information and knowledge of 1080 poison, the film strip is subject to revision. This film is to be used for MCWA personnel. Production number is MCWA-TE-5-065.0.

**UNDER CONTROL**, a color, sound, film strip, was produced in cooperation with TVA. It is a film strip designed to show the lay public just what the malaria problem is in the Tennessee Valley, and to explain what the Tennessee Valley Authority does to control malaria dangers created in impounded waters. Running time is 16 minutes. Production number is MCWA-TE-5-039.0.

**ANOPHELES CENSUS** is a black and white, sound, motion picture; running time about 22 minutes. It illustrates basic local entomological field procedures and is well adapted for showing to field personnel, particularly area supervisors, entomologists, inspectors, and related groups. The film shows: (1) how a preliminary survey is made to determine the need for a control program; (2) how control operations are initiated and carried out; and (3) ways in which the effectiveness of these operations are checked. Production number is MCWA-TE-4-026.

**YOUR FILM STRIP PROJECTOR** is a black and white, silent, film strip with titles explaining the proper operation and use of the standard film strip projector used by MCWA. Projection number is MCWA-TE-5-003.0.

**Aedes Aegypti CONTROL, EDITION II** is a black and white, sound, motion picture. Running time is about 16 minutes. This film is designed to train personnel in the inspection and control operations of *Aedes aegypti*. Production number is MCWA-TE-4-011.1.

**LE TOCA A UD**, a black and white, sound, motion picture, is a Spanish version of **IT'S UP TO YOU**. Running time is 18 minutes. This picture is identical with the English version, with the exception of the titles and narration which are in Spanish. The narration is designed to meet the needs of workers along the Mexican-United States border, and the Spanish narration is spoken in the dia-

lect of the border region. Production number is MCWA-TE-4-016.1.

**IDENTIFICATION OF FEMALE ANOPHELES OF THE UNITED STATES** is a color, sound, film strip; running time about 20 minutes. It is designed for use as a training film which explains how the various species of anophelines in this country can be identified. This film is particularly well adapted for inspectors, laboratory technicians, biology and entomology students. A test following the summary of descriptions of the species may be used to check classes on the material covered by the film. Production number is MCWA-TE-5-019.0.

**HANDBOOK** to accompany film strip. A handbook, "Identification of Female Anophelines in the United States," accompanies the film strip by the same name. This includes salient parts of the film strip, and may be used as an aid in identifying the various species of female *Anopheles* mosquitoes found in the United States.

**DIGEST OF AVAILABLE FILMS PREPARED.** Distribution Memoranda 15 and 15A containing brief descriptions of the motion pictures and film strips now available may be obtained upon request from the Training and Education Division. The fields of malaria, dengue and yellow fever, typhus, schistosomiasis, insect vector control, and film projection and use are covered by these 37 motion pictures and film strips, most of which have been produced by the Training and Education Division. Available films are classified as follows:

**Malaria and Insect Vector Control** — 27 motion pictures and film strips.  
**Dengue and Yellow Fever** — 6 motion pictures and film strips.  
**Typhus Fever** — 3 film strips.  
**Schistosomiasis** — 3 film strips.  
**Film Projection and Use** — 4 film strips and manuals.

The following includes a classified listing of available films and film strips:

## MALARIA

### Medical Aspects

CLINICAL MALARIA - motion picture, 20 min., sound.  
MICROSCOPICAL DIAGNOSIS OF HUMAN MALARIA - motion picture, 28 min., sound.  
EXPERIMENTAL TRANSMISSION OF MALARIA - motion picture, 17 min., sound.

### Entomological Aspects

ANOPHELES CENSUS - motion picture, 20 min., sound.  
GENERAL INSPECTION AND CONTROL ACTIVITIES AT AREA LEVEL - film strip, silent.  
REARING AND HANDLING OF ANOPHELINE MOSQUITOES - motion picture, 17 min., sound, color.  
IDENTIFICATION OF FEMALE ANO-  
LINES OF THE U. S. - film strip, 20 min., color.

### Engineering Aspects

#### and Insect Vector Control

DYNAMITE - motion picture, 12 min., sound.  
GENERAL INSPECTION AND CONTROL ACTIVITIES AT AREA LEVEL - film strip, silent.  
HAND SPRAYING OF DDT - film strip, sound, 15 min.  
HAND SPRAYING OF DDT (Quiz) - film strip.  
MIXING OF DDT EMULSIONS - Film strip, sound, 10 min.  
MIXING OF DDT EMULSIONS (Quiz) - film strip.  
MOSQUITO-PROOFING  
OIL LARVICIDING - motion picture, 12 min., sound, color.  
PARIS GREEN LARVICIDING - motion picture, 11 min., sound, color.  
PERMANENT DITCH LININGS - Film strip, sound, 15 min.  
POWER SPRAYING WITH DDT - Film strip, 14 min., sound.

POWER SPRAYING WITH DDT (Quiz)  
- film strip  
SAFE PRACTICES IN THE HANDLING OF DDT - film strip, sound.  
SAFE PRACTICES IN THE HANDLING OF DDT (Quiz) - film strip.

### Malaria Control Lay Education

CRIMINAL AT LARGE - motion picture and film strip.  
MALARIA - film strip and motion picture.  
MOSQUITO PROOFING - motion picture, 11 min., sound, color.  
SOLDIER FROM THE TROPICS - motion picture, sound, 10 min.  
SPRAYTIME - film strip, 13 min., sound.  
UNDER CONTROL - film strip, 15 min., sound, color.

## DENGUE AND YELLOW FEVER

### Aedes Aegypti Control

IT'S UP TO YOU - motion picture, 18 min., sound, color.  
AEDES AEGYPTI CONTROL - motion picture, sound, 17 min.

### Dengue and Yellow Fever Lay Education

LE TOCA A UD\* - motion picture, 18 min., sound (Spanish).  
IT'S UP TO YOU - motion picture, 18 min., sound.  
SU NO CONVIDADO HUESPED\* - film strip, 7 min., sound (Spanish).  
YOUR UNINVITED GUEST - film strip, 7 min., sound.

---

\* LE TOCA A UD is a Spanish version of IT'S UP TO YOU; and SU NO CONVIDADO HUESPED is the Spanish version of YOUR UNINVITED GUEST. These versions are for use in areas where the population is primarily Spanish speaking.

## TYPHUS

### Control

RECOGNITION OF RAT SIGNS IN DDT DUSTING - film strip, 7 min., sound.

EVALUATING DDT DUSTING IN MURINE TYPHUS CONTROL - film strip, 15 min., sound.

USE OF 1080 WATER IN RAT POISONING - film strip, 18 min.

## SCHISTOSOMIASIS

### Medical and Biological Aspects

SCHISTOSOMIASIS (Edition I, for medical groups) - film strip, sound, 12 min., color.

SCHISTOSOMIASIS (Edition II, for biological groups) - film strip, sound, color, 15 min.

LABORATORY DIAGNOSIS OF SCHISTOSOMIASIS - film strip, 19 min., sound, color.

## FILM PROJECTION AND USE

THE ARMY USES TRAINING FILMS - film strip, silent.

TIPS ON SLIDE FILMS - manual.

TRAINING FILM AND FILM STRIP PROJECTION - manual.

YOUR FILM STRIP PROJECTOR - film strip, silent.

**HANDBOOK AVAILABLE SOON.** The handbook, "DDT for Control of Household Pests," has been revised and sent to the Government Printing Office for printing under the title, "DDT for Control of Insects Affecting Health." This handbook will be available soon from the Government Printing Office for unlimited distribution.

**TYPHUS CONTROL TRAINING COURSES.** The fifth and sixth typhus control training courses have been completed by the Division of Training and Education. The fifth course, lasting two weeks, was designed for personnel from the marginal states; the sixth, a six weeks' intensive schedule, was primar-

ily for typhus control project supervisors.

### **TRAINING COURSE FOR ARMY ENGINEERS.**

Plans are underway for a three weeks training course starting April 29 in Atlanta for representatives of about forty U. S. Army Corps of Engineers from District and Division offices. The course will cover the various aspects of malaria control problems encountered in impounded waters.

This course, which will be conducted in the In-Service Training Section of the Training and Education Division, is a cooperative project of the Headquarters Office of MCWA, and the Health and Safety Department of the Tennessee Valley Association.

The Impounded Water Section of the Engineering Division will assist to a great extent during the first week of the instruction which will be held in Atlanta.

The last two weeks of the course will include field training conducted on TVA impoundments in Tennessee and Alabama under the guidance of TVA personnel. The group will observe operation of equipment and actual field work being done in these areas.

## **ENGINEERING DIVISION**

**PRELIMINARY SURVEYS BY IMPOUNDED WATER SECTION.** Preliminary malaria surveys have been made by the Impounded Water Section during the winter months. The primary objective of these surveys is to determine what malaria control operations are necessary for the protection of human populations adjacent to the proposed or existing water impoundments of the U. S. Engineer Department.

These surveys made at the request of the U. S. Army Engineers are paid for by that group.

Reports for all proposed lakes are approved by the respective State Health Departments prior to submission to the U.S.E.D. through official channels.



The present staff of the Impounded Water Section consists of Nelson H. Rector, Senior Sanitary Engineer (R); David S. Butler, P. A. Engineer (R); F. Earle Lyman, P. A. Sanitarian (R); Victor Tiship, P. A. Sanitarian (R); and H. H. Aygarn, Assistant Engineer (R).

The above mentioned officers are stationed in Headquarters office. The staff also includes Leslie D. Beadle, P. A. Sanitarian (R) stationed at Denison, Texas, and Richard L. Woodward, P. A. Engineer (R) stationed at Washington, D.C.

During the fall and winter months, the staff was assisted by Gerald Dyksterhouse, P. A. Engineer (R); James Turnbull, P. A. Engineer (R); Thomas A. Randle, P. A. Engineer (R); and Herman L. Fellton, Sanitarian (R). Other officers of Public Health Service District and State offices have assisted in surveys and in preparation of reports.

**USE OF 1080.** Compound 1080, sodium fluoroacetate, is a new and deadly rodent poison developed during the war. As instructions for the use of this poison are not given by the manufacturer, pest control operators are referred to the U. S. Public Health Service and to the Fish and Wildlife Service for directions and precautions which should be followed when using it.

Because of the extreme toxicity of the poison, Headquarters Office revised the Typhus Control Memorandum No. 12 to make it more stringent. No antidote for 1080 is known, so several precautions are being followed in its use. Most of these are outlined in the revision of Memorandum No. 12. The recommended concentration of 1080 in water has been reduced from the usual  $\frac{1}{2}$  oz. or 14 grams per gallon to 12 grams per gallon; as a further precaution, it is recommended that 1080 poison be used only in water, and not in food baits of any kind. Release slips are available, if desired, to permit authorized agents of U. S. Public

Health Service and state and local health representatives to use 1080 in various establishments, and to release their health departments from any liability which may be incurred. 1080 is to be used only in selected establishments and industrial areas by trained personnel of health departments, or by reliable pest control operators. It should be used by USPHS personnel only on approved typhus control programs.

A sound, film strip has been released to show the use of 1080. This is available upon request to State Health Departments.

In states where the health departments wish to protect themselves from liability claims, the area and project supervisors require owners of establishments to fill out a Request and Release slip for the use of 1080 Rodenticide. After these slips are signed by the owner of the establishment which is to be treated with the poison, they are returned to the state or local health departments. Use of these slips is optional with the states. Following is a copy of a Request and Release slip for use of 1080 Rodenticide.

#### REQUEST AND RELEASE SLIP FOR USE OF 1080 RODENTICIDE

The undersigned occupant or owner of the following establishment \_\_\_\_\_ located at (Street address, city and state) \_\_\_\_\_ requests the use of poison 1080 (sodium fluoroacetate) as a rodenticide in this establishment by authorized agents of (State or local health dept.) and will not hold the latter liable for any claim resulting from the use of this poison.

Signed \_\_\_\_\_

Witnessed by \_\_\_\_\_

**TYPHUS CONTROL PROJECTS.** Residual dusting operations for the control of murine typhus fever, include activities in 105 counties and parishes in nine Southeastern states, according to the January 1 report of Typhus Control activities. Ratproofing and rat eradication projects are being carried on in 99 counties of 11 states. The following table is a summary showing the states in which dusting, ratproofing and rat eradication projects are in operation and the number of counties or parishes in each state where control work is in progress.

Name of State	No. of Counties in Which Dusting Projects are in Operation.	No. of Counties in Which Ratproofing and Rat Eradication Projects are in Operation.
Alabama	8	8
Arkansas	--	2
Florida	5	6
Georgia	22	9
Louisiana	6	5
Mississippi	5	5
North Carolina	4	10
South Carolina	5	26
Tennessee	2	4
Texas	48	23
Virginia	--	1
<b>Total</b>	<b>105</b>	<b>99</b>

**RAT PROOFING VALUE OF CONSTRUCTION MATERIALS TESTED.** Arrangements have been made for conducting a series of tests to show the ratproofability of certain building materials such as asbestos, cement, wall board, and rock

wool used in construction of buildings and ships. These and other new materials are being tested at Carter Memorial Laboratory, under the supervision of San. (R) S. W. Simmons with San. (R) J. J. Essex acting in a consultant capacity.

Two main issues prompted the inauguration of the building material testing program. First, it is anticipated that there will be a very great increase in the building program within the next several years. As new homes and business establishments are constructed, an increasing demand will arise for building materials which are resistant to rats. Second, in the construction of new ships and vessels used in foreign and interstate commerce and trade, as well as in the repairing and remodeling of old vessels, the need for building materials which are rat proof is becoming greater. As materials are tested, reports will be made indicating the best types of material and their uses.

**IMPOUNDED WATERS MANUAL.** Representatives of a joint committee of TVA and MCWA have reviewed the manual **MALARIA CONTROL ON IMPOUNDED WATER**, written as a cooperative project by the two organizations. Editing of the manual is under the supervision of S. A. Sanitary Engineer (R) Charles I. Mansur. The manuscript has been submitted to the Government Printing Office.

**TYPHUS PROGRAM PROGRESSES.** The typhus field investigation program begun in south Georgia in December got into full swing during January. The findings of this program will indicate what effect DDT dusting and other typhus control measures have in preventing the spread of the disease among rats and human beings.

Rat-trapping operations are now under way, and complement fixation tests are being made on captured rats to determine their infection with typhus. A survey of the human population designed to locate unreported cases has been initiated also.

These studies are being pursued jointly by the Georgia State Health Department, the health departments of Decatur, Thomas, and Brooks counties, and MCWA. Headquarters for the program are at Thomasville, Ga.

**RODENT CONTROL SCHOOL AT BOSTON.** At the request of District One, a two-day Rodent-Control School was conducted in Boston, Massachusetts, on January 29 and 30, for state and local health personnel. The primary purpose of the meeting was to demonstrate the use and effectiveness of compound 1080 for killing rats.

In addition to members of the state and local health departments, representatives were present from the Fish and Wildlife Service, Food and Drug Administration, Pest Control Operators' Association, and the Army and Navy. More than 130 attended the meetings.

Several methods of poisoning were demonstrated on white rats in the classroom. One rat which drank 1080 water from an inverted flask, died fifty-two minutes later. Another, which had taken the poison directly by means of a stomach tube, died a little later than the first. A third rat, which drank 1080 poison water from a paper cup, died a few hours after taking the poison.

A demonstration of the rodenticide 1080 was conducted in the field as well as in the classroom. One abattoir in the Boston area yielded more than two dozen dead rats after 1080 poison had been used.

For demonstrating the effectiveness of ANTU poisoning, a white rat was permitted to walk for a few minutes through dust which contained ANTU. By the next morning this rat was dead.

Lectures and demonstrations were conducted by Dr. Vlado A. Getting, Massachusetts State Health Commissioner; Dr. E. R. Coffey, District Director; Herman L. Fellton, San. (R) from District One; Harry C. Essick, Sanitarian; John Wiley, S. A. San. Engr.; and Luthur S. Standifer, Engr. Aide, all from Headquarters.

**EXTENDED MALARIA CONTROL PROJECT PROPOSALS.** Project proposals for larviciding and residual spraying have been approved for the first six months of 1946. The accompanying table is a summary of the estimated number of houses which will be sprayed during this period.

*Estimation of  
Extended Malaria Control Project Proposals  
for Jan. 1 through June 30, 1946.*

State	No. of Counties in Which Work is Being Done	Estimated No. of Houses to be Sprayed.
Alabama	21	55,000
Arkansas	29	130,000
Florida	27	47,000
Georgia	54	178,000
Kentucky	11	12,000
Louisiana	15	51,000
Mississippi	16	84,000
Missouri	5	29,000
North Carolina	32	33,000
Oklahoma	5	20,000
South Carolina	23	71,000
Tennessee	10	19,000
Texas	33	102,000
<b>TOTAL</b>	<b>281</b>	<b>831,000</b>

# FIELD NOTES

## HAWAII DENGUE FEVER CONTROL

During the month of January, 29 zones, including 19 critical zones in the Honolulu area, were inspected regularly and completely. In the 19 critical zones, 12 showed a definite decrease in the breeding index, 6 showed an increase, and one showed no perceptible change. Of the 15,136 inspections made of premises, *Aedes* breeding was found on 488. On these premises, *Aedes* larvae were found in 717 various types of containers.

Complaints of mosquito breeding increased noticeably during January. These complaints were investigated systematically, and corrected. Most of them involved *Culex* breeding, and can be ascribed to the increase in rainfall during the month, with the resulting increase in the number of ground-pool areas. Remedial activities including extensive oiling, drainage and grading operations, and the filling in of low areas with dirt, should eliminate a great many of the breeding areas.

A recurrent problem of mosquito control in Honolulu has been the deliberate breeding of mosquitoes for fish food, by tropical fish breeders. Mosquito larvae are a convenient and readily available source of live food used to condition fish for breeding purposes. Corrective measures recommended to tropical fish breeders for this problem are the covering of all breeding tanks with mosquito netting and the removal of all excessive vegetation in tanks containing fish, so the fish may eat the mosquito larvae before pupation occurs.

Tests in which DDT was used in solution were made in connection with routine inspection activities to determine the effectiveness of this material. Preliminary figures for one normally high-breeding zone which was

inspected completely and carefully, and which received hand application of DDT, indicated that a high degree of control is being effected. This treatment with DDT will continue over a considerable period of time, and the results will be reported at a later date.

During the month of February, the inspector for the business district of Honolulu reported an increase in the number of discovered breeding places in that area. For the most part, these places consisted of bowls in which vines were growing. In an attempt to control mosquito breeding, the distribution of phenothiazine strips has been increased, and efforts are made to see that they are being used properly. All breeding found has been treated accordingly. Complaints concerning adult mosquitoes have been investigated and corrected.

An experimental DDT smoke generator for attachment to a jeep was used as a test for controlling adult mosquitoes. This device permits controlled distribution of DDT as a smoke aerosol under light wind or calm weather conditions. The smoke is nonirritating, and in a few limited trials has given satisfactory results. Tests will be continued to determine the over-all usefulness of this device as a means of reducing the adult mosquito population.

## "FLORIDA HEALTH NOTES" PRESENTS TYPHUS PROBLEM

The Florida State Board of Health is to be congratulated on its timely and interesting presentation of the murine typhus fever problem in that state, as described in the January issue of their monthly publication, "Florida Health Notes." Through a series of articles and illustrations, the bulletin shows the extent and serious-

ness of the typhus control problem, explains methods by which the disease is spread, and describes control measures already in operation in the various sections of the state. Most of the articles are written by field men who are doing actual control work.

It is anticipated that this bulletin will produce the desired effect of arousing and stimulating the interest of individual citizens, civic groups, towns, and cities, in starting appropriate long range control measures for murine typhus fever.

### ARKANSAS ANNOUNCES USE OF NEW LARVICIDE METHOD

In a recent edition of "The Arkansas Malaria Bulletin," monthly publication of the Arkansas State Board of health, it was announced that Arkansas will use the new "mist" type larvicide containing DDT and a spreading agent, in some of the more difficult zones this season. The new larvicide is applied as an aerosol or mist. This method of application, together with increased toxicity and spreading power of the new larvicide greatly reduces material and labor costs.

In the larvicidal mixture, one twentieth of a pound of DDT and 19 cc. of an emulsifier — B1956 — are added to one gallon of diesel oil. The DDT increases the killing power for the larvae without endangering cattle, fish, or wildlife. Use of this amount of DDT has been approved by Fish and Wild Life and health officials. They agree that it is harmless to animals and people when used in this small quantity.

The addition of B1956 to the oil increases its spreading effect when it reaches the water surface, making the larvicide effective over a larger area than an equal amount of untreated fuel oil.

The DDT larvicide is applied at the rate of one gallon per acre in contrast to the twenty gallons of fuel oil otherwise required. This saving in oil will reflect

an equal saving in the labor expended.

For applying the spray, the same type compressed air hand sprayer as is now being used in residual house spraying will be utilized.

### EFFECTS OF 1080 ON FISH

While conducting some experiments to determine the effects of certain new herbicides on fish, Joseph E. King of the U. S. Fish and Wildlife Service, New Orleans, and William T. Penfound, Tulane University, New Orleans, set up some tests using the new rodenticide 1080. It was found that fingerling bream and bass would survive in concentrations of 1080 as great as 370 p.p.m., for an indefinite period with no apparent discomfort.

### ERRATUM

The results showing control of *Xenopsylla cheopis*, as reported on page 7, paragraph 2, of the October-November-December Field Bulletin under Carter Memorial Laboratory Notes, was misleading. The report concerned two different observations.

In the first project, DDT residual spray was applied to the walls and ceilings in nine homes and three restaurants at the rate of 200 mg. per square foot. Eighty-four percent reduction was observed for *Xenopsylla cheopis* and all other fleas six to twelve days after treatment. In considering homes alone, however, no reduction was observed. These figures are based on the average number of fleas found on rats before and after treatment. Caution is urged in drawing conclusions from these data since only a few rats were examined. The degree of reduction, if any, was probably the result of accidental application of the spray to the floors.

In the second project, five percent DDT emulsion was sprayed in rat runs and burrows. Results were presented for three stores. In these, ninety-seven percent reduction of *Xenopsylla cheopis* was observed six to twelve days after treatment. Percent control for mites and lice was not included in this figure.

TABLE I  
HCRA Larvicide, Minor and Major Drainage Work  
NOVEMBER 18, -- DECEMBER 31, 1945

STATE	Area in Population	RESIDUAL SPRAYING		LARVICIDE USED				SURFACES TREATED ACRES		CLEARING		NEW DITCHING				Ditch Lining Lin. Ft.	Underground Drainage Lin. Ft.	Fill C.Y.	Water Surf. Eliminated Acres	Total Man Hours
		Number Pounds Sprayed	Pounds DDT Used	Oil Gals.	Paris Green Lbs.	Oiled	Dusted	Aquatic Veg. Acres	Land Veg. Acres	Cleaning Lin. Ft.	NEW DITCHING									
											Hand	Lin. Ft. Mach.	Dynamite	Total Co. Yds.						
Alabama	8	---	---	---	---	---	---	---	---	---	33,960	---	---	---	---	---	---	---	12,201	
Arkansas	13	---	---	---	---	---	---	66	101	40,095	3,912	---	---	374	---	---	---	---	31,152	
California	4	---	---	---	---	---	---	3	2	2,400	---	---	---	---	---	---	---	---	2,882	
District I	1	---	---	---	---	---	---	---	---	3,300	---	3,720	---	3,258	105	---	---	---	794	
Florida	7	---	---	---	25	---	50	1	1	16,578	6,985	---	---	755	124	---	150	---	6,467	
Georgia	7	---	---	---	---	---	---	2	6	11,570	---	---	---	---	---	---	5,035	---	14,775	
Louisiana	3	---	---	1,012	---	42	---	2	6	32,900	---	---	---	---	---	---	---	---	19,063	
Mississippi	6	---	---	---	---	---	---	6	43	13,400	---	---	---	---	---	---	---	1	12,358	
Missouri	1	---	---	---	---	---	---	---	---	220	---	---	---	---	600	---	---	---	8,874	
North Carolina	5	---	---	---	---	---	---	12	25	45,560	7,102	---	3,375	6,419	---	---	900	10	11,273	
Oklahoma	1	---	---	---	---	---	---	---	7	2,358	3,096	---	---	352	---	---	---	---	6,290	
Puerto Rico	7	---	---	1,628	9,759	120	4,826	1	16	243,961	2,280	1,208	---	3,122	---	---	1,045	---	62,340	
South Carolina	11	---	---	---	---	---	---	55	1	153,165	1,250	---	---	466	---	875	---	---	20,486	
Tennessee	3	---	---	---	---	---	---	3	3	11,860	4,752	---	---	742	3,037	---	301	1	10,793	
Texas	11	---	---	1,463	---	36	---	20	13	26,916	2,186	---	---	348	---	---	128	---	33,858	
Virginia	3	---	---	---	---	---	---	1	5	1,866	13,079	---	---	1,364	593	---	639	---	4,191	
Total	91	---	---	4,103	9,784	198	4,876	172	229	640,109	44,642	4,928	3,375	17,206	4,459	875	8,198	12	257,797	
Total 10-21 - 11-17	99	11,934	5,754	7,228	4,498	251	2,717	157	200	541,429	53,833	2,815	11,072	22,831	1,680	---	2,180	126	212,758	

TABLE II  
HCRA Personnel on Duty and Total Payroll  
DECEMBER 1945

STATE	COMMISSIONED		PROF. & SCI.		SUB-PROF. (1)		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	5	1,545	1	603	17	3,764	4	926	15	4,240	42	11,078	2.02	2.29
Arkansas	10	3,393	6	2,683	31	6,822	22	5,026	120	18,205	189	36,129	9.11	7.48
California	5	1,264	5	1,530	4	1,185	2	487	1	128	17	4,594	0.82	0.95
District of Columbia	1	333	---	---	---	---	---	---	---	---	1	333	0.05	0.07
Florida	8	2,155	4	1,872	57	13,133	9	2,092	33	9,144	111	28,396	5.35	5.88
Georgia	11	3,319	4	1,461	31	9,438	9	2,656	20	5,124	75	21,938	3.61	4.54
Illinois	2	692	---	---	---	57	1	524	5	548	8	1,821	0.38	0.38
Indiana	1	285	---	---	1	268	---	---	4	807	6	1,360	0.29	0.28
Iowa	---	---	1	178	---	---	---	---	---	---	1	178	0.05	0.04
Kentucky	4	1,479	1	369	3	2,169	4	911	5	5,726	17	10,654	0.82	2.20
Louisiana	8	3,475	3	1,298	42	12,320	9	2,097	61	14,691	123	33,881	5.93	7.01
Maryland	---	---	---	---	1	89	1	89	6	1,263	8	1,441	0.39	0.30
Mississippi	11	3,716	5	1,693	23	5,961	8	1,775	12	8,696	59	21,841	2.84	4.52
Missouri	2	552	1	344	12	3,079	3	541	47	10,518	65	15,034	3.13	3.11
North Carolina	6	1,770	4	1,686	5	2,426	4	1,064	60	18,300	79	25,246	3.81	5.22
Oklahoma	5	1,913	1	369	17	4,265	2	428	19	4,756	44	11,731	2.12	2.43
Oregon	---	---	---	---	1	306	---	---	---	---	1	306	0.05	0.06
South Carolina	9	2,992	7	2,506	26	9,262	7	2,102	75	15,870	124	32,732	5.98	6.77
Tennessee	4	1,169	2	1,044	17	4,842	5	1,441	48	8,903	76	17,399	3.66	3.60
Texas	9	2,986	4	1,845	19	5,406	10	2,370	64	15,570	106	28,177	5.11	5.83
Virginia	1	333	2	635	7	2,039	2	662	20	6,730	32	10,399	1.54	2.15
Aedes aegypti	---	---	---	---	5	1,067	1	222	---	---	6	1,289	0.29	0.27
Alabama	---	---	---	---	23	5,730	---	---	---	---	23	5,730	1.11	1.19
Florida	---	---	---	---	5	1,333	---	---	---	---	6	1,448	0.29	0.30
Georgia	---	---	1	115	---	---	---	---	---	---	---	---	---	---
Louisiana	1	285	---	---	8	1,593	1	155	---	---	10	2,033	0.48	0.42
South Carolina	1	285	---	---	5	1,432	1	227	---	---	7	1,944	0.34	0.40
Texas	2	618	---	---	10	2,674	2	264	---	---	14	3,556	0.67	0.74
Hq. & Dist. (2)	95	33,428	23	7,011	71	15,821	232	56,217	84	14,520	505	126,997	24.34	26.28
Puerto Rico	7	2,036	1	446	7	1,996	6	1,859	260	11,690	281	18,027	13.54	3.73
Honolulu, T.H.	4	1,172	---	---	32	5,829	2	366	1	189	39	7,556	1.88	1.56
Total	212	71,195	76	27,628	480	124,306	347	84,501	960	175,618	2,075	483,248	100.00	100.00
Percent of Total	10.22	14.73	3.66	5.72	23.13	25.72	16.72	17.49	46.27	36.34	100.00	100.00		

(1) Includes Entomological Inspectors.  
(2) Includes Headquarters and District Offices, Mobile Units, Malaria Survey, Imported Malaria Control, Special Investigations, and employees temporarily attached to Headquarters pending assignment to States.



TABLE III  
MCWA Expenditures and Liquidations by Major Items

DECEMBER 1945				
	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$483,252.68	68.62	\$18,027.19	85.82
02 Travel	28,923.36	4.11	469.50	2.23
03 Transportation of Things	31,635.00	4.49	---	---
04 Communication Services	2,108.19	0.30	20.00	0.10
05 Rent and Utility Service	4,192.34	0.60	---	---
06 Printing and Binding	3,928.30	0.56	---	---
07 Other Contractual Service	17,209.54	2.44	96.00	0.46
08 Supplies and Materials	114,722.91	16.29	2,393.12	11.39
09 Equipment	18,243.99	2.59	---	---
10 Land and Structures	---	---	---	---
TOTAL	\$704,216.31	100.00	\$21,005.81	100.00
Expenditures Other Than Personal Services	\$220,963.63	31.38	\$ 2,978.62	14.18

TABLE IV  
Typhus Expenditures and Liquidations by Major Items

DECEMBER 1945				
	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$71,669.67	89.32	\$651.90	100.00
02 Travel	---	---	---	---
03 Transportation of Things	3,000.00	3.74	---	---
04 Communication Services	16.30	0.02	---	---
05 Rent and Utility Service	---	---	---	---
06 Printing and Binding	---	---	---	---
07 Contractual Service	1,136.83	1.41	---	---
08 Supplies and Material	2,534.01	3.16	---	---
09 Equipment	1,883.37	2.35	---	---
TOTAL	\$80,240.18	100.00	\$651.90	100.00
Expenses Other Than Personal Services	\$ 8,570.51	10.68	---	---

TABLE V  
Typhus Control Personnel on Duty and Total Payroll

DECEMBER 1945														
AREA	COMMISSIONED		PROF. & SCI.		SUB-PROF.		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	1	285	1	344	11	2,767	---	---	26	3,524	39	6,920	11.78	9.57
Arkansas	1	302	---	---	11	2,420	---	---	19	3,667	31	6,389	9.37	8.83
Florida	---	---	---	---	13	1,116	---	---	3	155	16	1,271	4.83	1.76
Georgia	---	---	4	642	28	3,953	2	293	8	992	42	5,880	12.69	8.13
Louisiana	---	26	---	---	13	2,772	---	---	7	1,274	20	4,072	6.04	5.63
Mississippi	---	---	1	229	8	2,094	---	---	9	1,494	18	3,817	5.44	5.28
North Carolina	2	533	---	---	5	1,522	1	201	13	2,072	21	4,328	6.35	5.98
South Carolina	---	---	1	140	10	2,965	---	---	9	1,599	20	4,704	6.04	6.51
Texas	---	---	3	688	65	16,376	1	197	12	2,520	81	19,781	24.47	27.35
Tennessee	---	---	1	252	2	485	---	---	3	502	6	1,239	1.81	1.71
Virginia	---	---	---	---	1	149	---	---	---	---	1	149	0.30	0.21
Headquarters	8	2,906	2	2,112	9	3,661	5	2,357	8	1,354	32	12,390	9.67	17.13
Puerto Rico	---	---	1	652	---	---	---	---	---	---	1	652	0.30	0.90
Savannah Unit, Ga.	1	285	---	---	2	444	---	---	---	---	3	729	0.91	1.01
Total	13	4,337	14	5,059	178	40,724	9	3,048	117	19,153	331	72,321	100.00	100.00
Percent of Total	3.93	6.00	4.23	7.00	53.77	56.31	2.72	4.21	35.35	26.48	100.00	100.00		

TABLE VI  
HCWA Larvicide, Minor and Major Drainage Work  
JANUARY 1, - JANUARY 26, 1946

STATE	Area in Operation	LARVICIDAL WORK								DRAINAGE OPERATIONS										Total Man Hours	
		RESIDUAL SPRAYING		LARVICIDE USED		SURFACES TREATED ACRES		CLEARING		NEW DITCHING				Ditch Lining Lin. Ft.	Underground Drainage Lin. Ft.	Fill C. Y.	Water Surf. Eliminated Acres				
				Oil Gals.	Paris Green Lbs.	Oiled	Deated	Aquatic Veg. Acres	Land Veg. Acres	Cleaning Lin. Ft.	Hand	Lin. Ft. Mach.	Dynamite					Total Cu. Yds.			
		Number Houses Sprayed	Pounds DDT Used																		
Alabama	9	---	---	---	---	---	---	---	---	27,680	---	---	---	---	---	---	---	---	---	---	9,045
Arkansas	11	---	---	---	---	---	---	8	8	44,301	12,968	---	---	1,121	---	---	---	---	---	---	16,871
California	2	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	1,370
District I	1	---	---	---	---	---	---	---	---	---	---	---	---	---	55	---	---	---	---	---	464
Florida	6	---	---	---	---	---	---	---	---	8,060	2,400	---	---	263	---	---	---	---	---	---	2,452
Georgia	9	---	---	---	---	---	---	3	6	685	---	---	---	---	---	---	5,700	---	---	---	11,327
Louisiana	2	---	---	51	---	2	---	1	2	12,000	---	---	---	---	---	---	---	111	---	---	13,153
Mississippi	5	---	---	---	---	---	---	---	19	---	---	---	---	---	---	---	---	---	---	---	9,696
Missouri	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1,384
North Carolina	3	---	---	---	---	---	---	---	1	114,549	7,450	---	1,200	2,229	---	---	520	15	---	---	6,036
Oklahoma	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4,165
Puerto Rico	6	---	---	1,370	4,497	80	2,531	2	3	111,086	710	3,328	---	6,484	---	---	---	---	---	---	32,145
South Carolina	7	---	---	---	---	---	---	---	---	1,810	500	---	---	170	---	---	---	---	---	---	9,863
Tennessee	3	---	---	---	---	---	---	---	3	11,520	1,498	---	---	726	2,655	---	157	---	---	---	7,986
Texas	12	---	---	862	---	51	---	11	3	21,610	907	---	---	94	---	---	61	1	---	---	21,575
Virginia	2	---	---	---	---	---	---	---	1	1,700	9,819	---	---	868	---	---	528	---	---	---	1,900
Total	78	---	---	2,283	4,497	133	2,531	26	47	355,001	36,252	3,328	1,200	11,955	2,710	---	7,077	16	---	---	149,432
Total 11-18 - 12-31	91	---	---	4,103	9,784	192	4,876	172	229	640,109	44,642	4,928	3,375	17,200	4,459	875	8,198	12	---	---	257,797

TABLE VII  
HCWA Personnel on Duty and Total Payroll  
JANUARY 1946

STATE	COMMISSIONED		PROF. & SCI.		SUB-PROF. (1)		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	6	2,098	1	238	14	2,306	4	617	16	2,062	41	7,321	2.12	2.31
Arkansas	10	2,833	9	1,936	30	5,183	29	4,405	89	10,262	167	24,619	8.63	7.75
California	5	1,447	---	---	4	716	2	325	5	671	16	3,159	0.83	1.00
District of Columbia	1	333	---	---	---	---	---	---	---	---	1	333	0.05	0.10
Florida	6	1,849	4	1,112	52	8,617	9	1,408	35	4,072	106	17,058	5.48	5.37
Georgia	10	3,160	5	1,122	31	4,994	8	1,387	19	2,283	73	12,946	3.77	4.08
Illinois	3	1,010	---	---	---	---	---	18	---	12	3	1,040	0.16	0.33
Indiana	1	285	---	---	1	178	---	---	4	471	6	934	0.31	0.29
Kentucky	4	1,237	1	246	3	578	4	608	5	642	17	3,311	0.88	1.04
Louisiana	8	2,416	3	721	40	6,581	10	1,405	59	6,934	120	18,057	6.20	5.69
Maryland	---	---	---	---	1	178	---	---	---	---	1	178	0.05	0.06
Mississippi	11	3,338	6	1,210	24	3,574	7	1,109	18	2,283	66	11,514	3.41	3.63
Missouri	2	600	1	229	11	2,579	5	911	10	1,331	29	5,650	1.50	1.78
North Carolina	5	1,485	4	1,225	5	822	4	704	40	8,527	58	12,763	3.00	4.02
Oklahoma	1	125	1	123	16	2,262	2	290	19	2,538	39	5,338	2.02	1.68
Oregon	---	---	---	---	1	204	---	---	---	---	1	204	0.05	0.06
South Carolina	9	2,752	7	1,742	25	5,319	7	1,219	64	8,715	112	19,747	5.79	6.22
Tennessee	3	893	2	692	16	2,901	5	802	48	5,536	74	10,824	3.83	3.41
Texas	8	2,534	5	1,300	33	4,708	12	1,685	63	7,363	121	17,590	6.26	5.54
Virginia	1	333	1	355	7	1,798	2	408	19	4,861	30	7,755	1.55	2.44
Aedes aegypti	---	---	---	---	4	646	1	148	---	---	5	794	0.26	0.25
Alabama	---	---	---	---	23	3,815	---	---	---	---	23	3,815	1.19	1.20
Florida	---	---	---	---	5	814	---	---	---	---	5	814	0.26	0.26
Georgia	---	---	---	---	9	1,443	1	151	---	---	11	1,879	0.57	0.59
Louisiana	1	285	---	---	5	858	1	151	---	---	7	1,294	0.36	0.41
South Carolina	1	285	---	---	11	2,296	2	277	---	---	15	3,240	0.78	1.02
Texas	2	667	---	---	---	---	---	---	---	---	---	---	---	---
Hc. & Dist. (2)	96	33,211	26	5,664	75	11,009	249	40,552	90	12,311	536	102,747	27.71	32.36
Puerto Rico	7	2,036	3	870	5	885	7	1,463	192	10,028	214	15,282	11.07	4.81
Honolulu T. H.	3	783	---	---	31	5,953	2	366	1	189	37	7,291	1.91	2.30
Total	204	65,995	79	18,785	482	81,217	373	60,409	796	91,691	1,934	317,497	100.00	100.00
Percent of Total	10.55	20.78	4.08	5.92	24.92	25.58	19.29	19.03	41.16	28.69	100.00	100.00		

(1) Includes Entomological Inspectors.

(2) Includes Headquarters and District Offices, Mobile Units, Malaria Survey, Imported Malaria Control, Special Investigations and employees temporarily attached to Headquarters pending assignment to states.

**TABLE VIII**  
**MCWA Expenditures and Liquidations by Major Items**

JANUARY 1946

	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$294,923.16	49.36	\$15,281.99	89.22
02 Travel	48,323.62	8.09	103.10	0.60
03 Transportation of Things	2,804.31	0.47	---	---
04 Communication Services	2,927.19	0.49	21.11	0.12
05 Rent and Utility Service	5,694.46	0.95	---	---
06 Printing and Binding	3,922.72	0.65	---	---
07 Other Contractual Service	18,263.94	3.06	190.25*	1.11*
08 Supplies and Materials	145,235.83	24.31	1,913.27	11.17
09 Equipment	75,412.74	12.62	---	---
10 Land and Structures	---	---	---	---
<b>TOTAL</b>	<b>\$597,507.97</b>	<b>100.00</b>	<b>\$17,129.22</b>	<b>100.00</b>
Expenditures Other Than Personal Services	\$302,584.81	50.64	1,847.23	10.78

\* Credit figure reflected above is due to credit adjustments exceeding obligations during month.

**TABLE IX**  
**Typhus Expenditures and Liquidations by Major Items**

JANUARY 1946

	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$58,996.27	59.31	---	---
02 Travel	---	---	---	---
03 Transportation of Things	---	---	---	---
04 Communication Services	5.85	0.01	---	---
05 Rent and Utility Service	32.13	0.03	---	---
06 Printing and Binding	---	---	---	---
07 Contractual Services	999.13	1.00	---	---
08 Supplies and Materials	37,987.38	38.19	---	---
09 Equipment	1,447.37	1.46	---	---
<b>TOTAL</b>	<b>\$99,468.13</b>	<b>100.00</b>	<b>---</b>	<b>---</b>
Expenses Other Than Personal Services	\$40,471.86	40.69	---	---

**TABLE X**  
**Typhus Control Personnel on Duty and Total Payroll**  
JANUARY 1946

AREA	COMMISSIONED		PROF. & SCI.		SUB-PROF.		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	1	285	1	229	12	1,844	---	---	28	3,002	42	5,360	11.57	9.09
Arkansas	1	302	---	---	10	1,665	---	---	21	2,610	32	4,577	8.82	7.76
Florida	---	---	---	---	15	2,342	---	---	2	242	17	2,584	4.68	4.38
Georgia	1	293	5	1,214	34	5,684	2	293	6	729	48	8,213	13.22	13.92
Louisiana	---	---	---	---	15	2,449	---	---	5	583	20	3,032	5.51	5.14
Mississippi	---	---	1	233	10	1,576	---	---	8	955	19	2,764	5.23	4.68
North Carolina	2	533	---	---	5	861	1	134	16	1,573	24	3,101	6.61	5.26
South Carolina	---	---	1	280	11	2,328	---	---	9	1,448	21	4,056	5.79	6.87
Texas	---	---	3	688	58	10,496	1	131	11	1,465	73	12,780	20.11	21.66
Tennessee	---	---	1	229	4	565	---	---	6	544	11	1,338	3.03	2.27
Headquarters	11	3,652	2	577	28	4,354	3	715	10	1,217	54	10,515	14.88	17.82
Savannah Unit, Ga.	1	337	---	---	1	339	---	---	---	---	2	676	0.55	1.15
<b>Total</b>	<b>17</b>	<b>5,402</b>	<b>14</b>	<b>3,450</b>	<b>203</b>	<b>34,503</b>	<b>7</b>	<b>1,273</b>	<b>122</b>	<b>14,368</b>	<b>363</b>	<b>58,996</b>	<b>100.00</b>	<b>100.00</b>
Percent of Total	4.68	9.16	3.86	5.85	55.92	58.48	1.93	2.16	33.61	24.35	100.00	100.00		

TABLE XI  
MCAA Larvicide, Minor and Major Drainage Work  
JANUARY 27, - FEBRUARY 23, 1944

STATE	Area in Operation	LARVICIDAL WORK						DRAINAGE OPERATIONS										Total Man Hours
		RESIDUAL SPRAYING		LARVICIDE USED		SURFACES TREATED ACRES		CLEARING		NEW DITCHING				Ditch Lining Lin.Ft.	Underground Drainage Lin.Ft.	Fill C.Y.	Water Surf. Eliminated Acres	
		Number Houses Sprayed	Pounds DDT Used	Oil Gals.	Peria Green Lbs.	Oiled	Dusted	Aquatic Veg. Acres	Land Veg. Acres	Cleaning Lin. Ft.	Hand	Lin.Ft. Mach.	Dynamite					
Alabama	8	---	---	---	---	---	---	---	---	10,000	---	---	---	---	---	---	---	6,054
Arkansas	13	---	---	---	---	---	---	19	5	72,450	19,472	---	---	1,177	---	---	7	19,862
California	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	976
District I	1	---	---	---	---	---	---	---	---	---	500	---	---	101	---	---	11	320
Florida	7	---	---	---	---	---	---	---	---	5,300	2,250	---	---	213	---	---	6	3,898
Georgia	9	---	---	---	---	---	---	1	3	4,150	---	---	---	---	---	1,750	---	7,185
Louisiana	2	---	---	---	---	---	---	1	---	1,300	---	---	---	---	---	130	---	12,105
Mississippi	4	---	---	---	---	---	---	---	10	---	---	---	---	---	---	---	---	9,826
Missouri	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3,547
North Carolina	4	---	---	---	---	---	---	---	2	96,732	900	---	---	100	---	500	---	3,454
Oklahoma	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3,458
Puerto Rico	7	---	---	809	1,684	71	1,344	4	4	148,369	700	---	3,263	5,180	---	---	---	24,525
South Carolina	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10,168
Tennessee	3	---	---	---	---	---	---	---	---	1,670	1,022	---	---	351	1,967	---	186	6,697
Texas	12	---	---	325	---	23	---	7	8	19,045	1,648	---	80	801	---	---	13	19,170
Virginia	3	---	---	---	---	---	---	---	3	3,967	14,344	---	---	1,412	---	720	---	2,778
Total	82	---	---	1,134	1,684	94	1,344	32	35	362,983	40,836	---	3,343	9,335	1,967	500	2,799	134,027
Total 1-1-26	78	---	---	2,283	4,497	133	2,531	26	47	355,001	36,252	3,328	1,200	11,955	2,710	---	7,077	149,432

TABLE XII  
MCAA Personnel on Duty and Total Payroll  
FEBRUARY 1946

STATE	COMMISSIONED		PROF. & SCI.		SUB-PROF. (1)		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	4	1,292	1	178	15	2,143	4	537	12	1,319	36	5,469	1.97	1.69
Arkansas	9	2,639	7	1,966	33	5,830	32	5,455	71	9,227	152	25,117	8.32	7.76
California	3	843	---	---	3	578	2	325	3	667	11	2,413	0.60	0.74
District of Columbia	1	329	---	---	---	---	---	---	---	---	1	329	0.06	0.10
Florida	6	1,794	5	895	44	7,085	9	1,056	22	3,406	86	14,236	4.71	4.40
Georgia	9	2,823	6	921	28	4,373	9	1,167	7	5,020	59	14,304	3.23	4.42
Illinois	1	329	---	8	---	---	---	---	---	---	1	337	0.05	0.10
Indiana	1	285	---	---	1	178	---	---	---	105	2	568	0.11	0.17
Kentucky	3	939	2	255	4	425	4	456	5	536	18	2,611	0.99	0.81
Louisiana	6	1,999	3	649	33	7,294	9	1,151	38	20,863	89	31,956	4.87	9.87
Mississippi	11	3,205	5	1,222	29	4,113	8	1,173	17	2,104	70	11,817	3.83	3.65
Missouri	2	585	1	229	10	1,636	5	843	12	1,947	30	5,240	1.64	1.62
North Carolina	6	1,757	3	760	5	625	4	501	54	3,728	72	7,371	3.94	2.28
Oklahoma	3	1,095	1	246	16	2,655	2	285	9	2,200	31	6,481	1.70	2.00
Oregon	---	---	---	---	1	204	---	---	---	---	1	204	0.06	0.06
South Carolina	7	2,060	7	1,765	27	5,984	7	1,011	79	8,184	127	19,004	6.96	6.87
Tennessee	3	883	2	433	17	2,183	5	622	44	5,126	71	9,247	3.89	2.86
Texas	7	2,247	6	1,932	20	5,106	10	1,686	58	15,016	101	25,987	5.53	8.02
Virginia	1	329	1	348	7	1,178	2	408	18	2,606	29	4,869	1.59	1.50
<i>Aedes aegypti</i>	---	---	---	---	5	762	1	111	---	---	6	873	0.33	0.27
Alabama	---	---	---	---	23	2,847	---	---	---	---	23	2,847	1.26	0.88
Florida	---	---	---	---	2	635	---	---	---	---	2	635	0.11	0.20
Georgia	---	---	---	---	8	1,024	1	114	---	---	10	1,419	0.55	0.44
Louisiana	1	281	---	---	5	858	1	151	---	---	7	1,294	0.38	0.40
South Carolina	1	285	---	---	12	2,438	2	277	---	---	16	3,373	0.88	1.04
Texas	2	658	---	---	---	---	---	---	---	---	---	---	---	---
Hq. & Dist. (2)	97	35,015	28	5,794	73	10,956	252	40,253	105	13,719	555	105,737	30.39	32.65
Puerto Rico	7	2,018	3	870	5	1,050	5	1,151	166	8,046	186	13,135	10.19	4.06
Honolulu T. H.	2	675	---	---	29	5,709	2	366	1	189	34	6,939	1.86	2.14
Total	193	64,365	81	18,471	455	77,869	376	59,099	721	104,008	1,826	323,812	100.00	100.00
Percent of Total	10.57	19.88	4.44	5.70	24.92	24.05	20.59	18.25	39.48	32.12	100.00	100.00		

(1) Includes Entomological Inspectors.

(2) Includes Headquarters and District Offices, Mobile Units, Malaria Survey, Imported Malaria Control, Special Investigations and employees temporarily attached to Headquarters pending assignment to states.

**TABLE XIII**  
*MCWA Expenditures and Liquidations by Major Items*

FEBRUARY 1946

	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$303,736.41	58.01	\$13,135.15	90.87
02 Travel	36,699.75	7.01	145.00	1.00
03 Transportation of Things	2,907.94	0.55	---	---
04 Communication Services	2,491.76	0.48	24.70	0.17
05 Rent and Utility Service	4,551.47	0.87	---	---
06 Printing and Binding	6,356.66	1.21	---	---
07 Other Contractual Service	15,777.98	3.01	22.00	0.15
08 Supplies and Materials	139,443.91	26.63	1,106.76	7.66
09 Equipment	11,664.21	2.23	21.60	0.15
10 Land and Structures	---	---	---	---
<b>TOTAL</b>	<b>\$523,630.09</b>	<b>100.00</b>	<b>\$14,455.21</b>	<b>100.00</b>
Expenditures Other Than Personal Services	\$219,893.68	41.99	\$ 1,320.06	9.13

**TABLE XIV**  
*Typhus Expenditures and Liquidations by Major Items*

FEBRUARY 1946

	CONTINENTAL U. S.	PERCENTAGE OF TOTAL	PUERTO RICO	PERCENTAGE OF TOTAL
01 Personal Services	\$ 56,003.44	33.68	---	---
02 Travel	---	---	---	---
03 Transportation of Things	---	---	---	---
04 Communication Services	18.90	0.01	---	---
05 Rent and Utility Service	27.39	0.02	---	---
06 Printing and Binding	8.10	0.01	---	---
07 Contractual Services	1,040.42	0.63	---	---
08 Supplies and Materials	1,751.49	1.05	---	---
09 Equipment	107,407.48	64.60	---	---
<b>TOTAL</b>	<b>\$166,257.22</b>	<b>100.00</b>	<b>---</b>	<b>---</b>
Expenses Other Than Personal Services	\$110,253.78	66.32	---	---

**TABLE XV**  
*Typhus Control Personnel on Duty and Total Payroll*

FEBRUARY 1946

AREA	COMMISSIONED		PROF. & SCI.		SUB-PROF.		C. A. F.		CUSTODIAL AND PER HOUR		TOTAL		PERCENT OF TOTAL	
	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY	NO.	PAY
Alabama	1	281	1	172	13	1,689	---	---	26	2,577	41	4,719	10.49	8.42
Arkansas	1	220	---	---	10	1,592	---	---	18	2,412	29	4,224	7.42	7.54
Florida	---	---	---	---	14	1,663	2	181	3	272	19	2,116	4.86	3.78
Georgia	5	1,469	7	1,140	47	5,644	1	183	12	954	72	9,390	18.41	16.77
Louisiana	---	---	---	---	12	1,770	---	---	5	491	17	2,261	4.35	4.04
Mississippi	---	---	2	467	9	1,562	---	---	9	899	20	2,928	5.11	5.23
North Carolina	1	281	---	---	7	816	1	100	17	1,277	26	2,474	6.65	4.42
South Carolina	---	---	2	509	11	2,058	---	---	13	1,222	26	3,789	6.65	6.76
Tennessee	---	---	1	172	4	455	---	---	6	447	11	1,074	2.81	1.92
Texas	---	---	3	688	55	11,915	1	131	14	2,004	73	14,738	18.67	26.31
Headquarters	9	3,198	3	518	29	3,181	2	229	11	669	54	7,795	13.81	13.92
Puerto Rico	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Savannah Unit, Ga.	1	339	---	---	2	158	---	---	---	---	3	497	0.77	0.89
<b>Total</b>	<b>18</b>	<b>5,788</b>	<b>19</b>	<b>3,666</b>	<b>213</b>	<b>32,503</b>	<b>7</b>	<b>824</b>	<b>134</b>	<b>13,224</b>	<b>391</b>	<b>56,005</b>	<b>100.00</b>	<b>100.00</b>
Percent of Total	4.60	10.33	4.86	6.55	54.48	58.04	1.79	1.47	34.27	23.61	100.00	100.00		